Diesse Vesmatic Interface
User Guide

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Friday, 24 August 2007

Diesse Vesmatic Interface

User Guide

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by Mike Noordermeer

The Diesse Vesmatic Interface is a .NET 2.0 Winforms application designed to control Vesmatic-10 and Vesmatic-20 instruments.

This User Guide provides basic information regarding the use of the Diesse Vesmatic Interface. It is your responsibility to ensure you are using the latest version of the software, and user guide.

Diesse Vesmatic Interface

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1 Revisions

Version 0.9.0.0	Revised by : Mike Noordermeer
18 June 2007	First draft
Version 1.0.0.0	Revised by : Mike Noordermeer
21 June 2007	Updated document to reflect changes in firmware support

2 Introduction

ESR is a nonspecific screening test for various diseases. This 1-hour test measures the distance (in millimeters) that red blood cells settle in unclotted blood toward the bottom of a specially marked test tube.

The erythrocyte sedimentation rate can be used to monitor inflammatory or malignant disease. Although it is a screening test (i.e. it cannot be used to diagnose a specific disorder), it is useful in detecting and monitoring tuberculosis, tissue necrosis, rheumatologic disorders, or an otherwise unsuspected disease in which symptoms are vague or physical findings are minimal.

Normal Values

Adults (Westergren method):
- Men under 50 years old: less than 15 mm/hr.
- Men over 50 years old: less than 20 mm/hr.
- Women under 50 years old: less than 20 mm/hr.
- Women over 50 years old: less than 30 mm/hr.

Children (Westergren method):
- Newborn: 0 to 2 mm/hr.
- Neonatal to puberty: 3 to 13 mm/hr.

Note: mm/hr. = millimeters per hour.

The Diesse Vesmatic Interface is a simple .Net 2.0 Winforms application written in C#. Prior to routine operation, the application must be configured. The application can control any combination of Vesmatic-10, Vesmatic-20, and Ves-Easy instruments provided each device uses its own serial port, i.e. you can not daisy-chain Vesmatic-20 instruments.

While described as 'random access' instruments, the Vesmatic-10 firmware does not allow an interfaced instrument to operate in this fashion. To obtain results from the instrument, it must be in a 'free' state. This only occurs when the instrument is not analyzing - therefore the instrument must be used in batch mode (or a hybrid of batch mode) to permit the upload of results from the instrument to the LIS.

It is assumed

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- You are familiar with the operation of the Vesmatic-10/Easy and Vesmatic-20 instruments
- On each instrument you can enter service mode and determine the device id and baud rate
- You can use Windows Device Manager to determine which serial port(s) is used with the Vesmatic-10 instrument(s).

3 System requirements

Listed below are the minimum sofware and operating system requirements.

Prerequisite software	Microsoft Core XML Services (MSXML) 6.0 Internet Explorer 6 SP1 or higher Microsoft .NET Framework Version 2.0 Redistributable Package (x86) SQL Server 2005 Express
RAM	Minimum: 192 MB Recommended: 512 MB or higher
Hard disk space	700 MB free space
Processor	Pentium III Compatible or higher Minimum: 500 MHz Recommended: 1 GHz or higher
Operating system	All editions of Microsoft Windows 2000 with Service Pack 4 All editions of Microsoft Windows XP with Service Pack 2 All editions of Microsoft Windows Server 2003 Service Pack 1 All editions of Microsoft Windows Small Business Server 2003 Service Pack 1

If TCP/IP LIS upload is used, the instrument PC must be connected to the network.

4 Workflow

The following workflows are used when developing the interface:

Vesmatic 10/EASY

1. At **Select Function**, press the **Menu button**.
2. Press the **Down** button until **ESR 1 Random** is displayed.
3. Press the **OK** button. **Run** is displayed, the instrument initialises, and goes into **20 minute random** mode.
4. FFFFF FFFFF is then displayed. Each letter corresponds to a test position. First FFFFF position 1 – 5 and then 6 – 10.
5. Scan the bar code of a patient's tube and slot into any position from 1 – 10. The instrument will display the barcode and start beeping until the tube is inserted into a test slot.
6. The instrument will then scan the tube to read the starting levels and change

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the display for that slot from **F** to **1** to **2** to **A**. When finished analysis, **W** is displayed.

7. Scan the next patient barcode and place in an available slot. The instrument is in random mode so tests can be started at any time i.e, you don't have to wait for analysis to be finished before starting another.
8. After 20 minutes the instrument takes final readings and computes the ESR.

Vesmatic 20

1. At **Select Function**, press the **Menu** button.
2. **Analysis ESR F1** is displayed. Press the **OK** button.
3. **Manual loading?** is displayed. Press the **OK** button. The instrument will rotate the carousel and find the home position.
4. **Read 01 Codes**
   Position 01.
5. Scan the bar code of the first patient's tube and slot it into position 01. The carousel will advance to position 02 and **stored** will be displayed followed by step 6. If the barcode is not scanned within 10 seconds, a beep is emitted and **Disp to Edit OK to Retry** is displayed. Press **OK** to rescan the barcode, or **Disp** to enter manually.
6. **Read 02 Codes**
   Position 02
7. Scan the second patient's tube and place in position two.
8. Continue until all tubes are scanned or all positions are filled.
9. The loading process will terminate automatically when all tubes are filled. If not all tubes are filled, press **Esc** twice and then press **OK**.
10. Press **Esc** again to the question **Print Joblist?**.
11. The machine will then analyse all tubes.

5 User interface

The application uses a very simple user interface, and may be considered as 3 separate parts : the results panel, the communications control panel, and the sample status panel.

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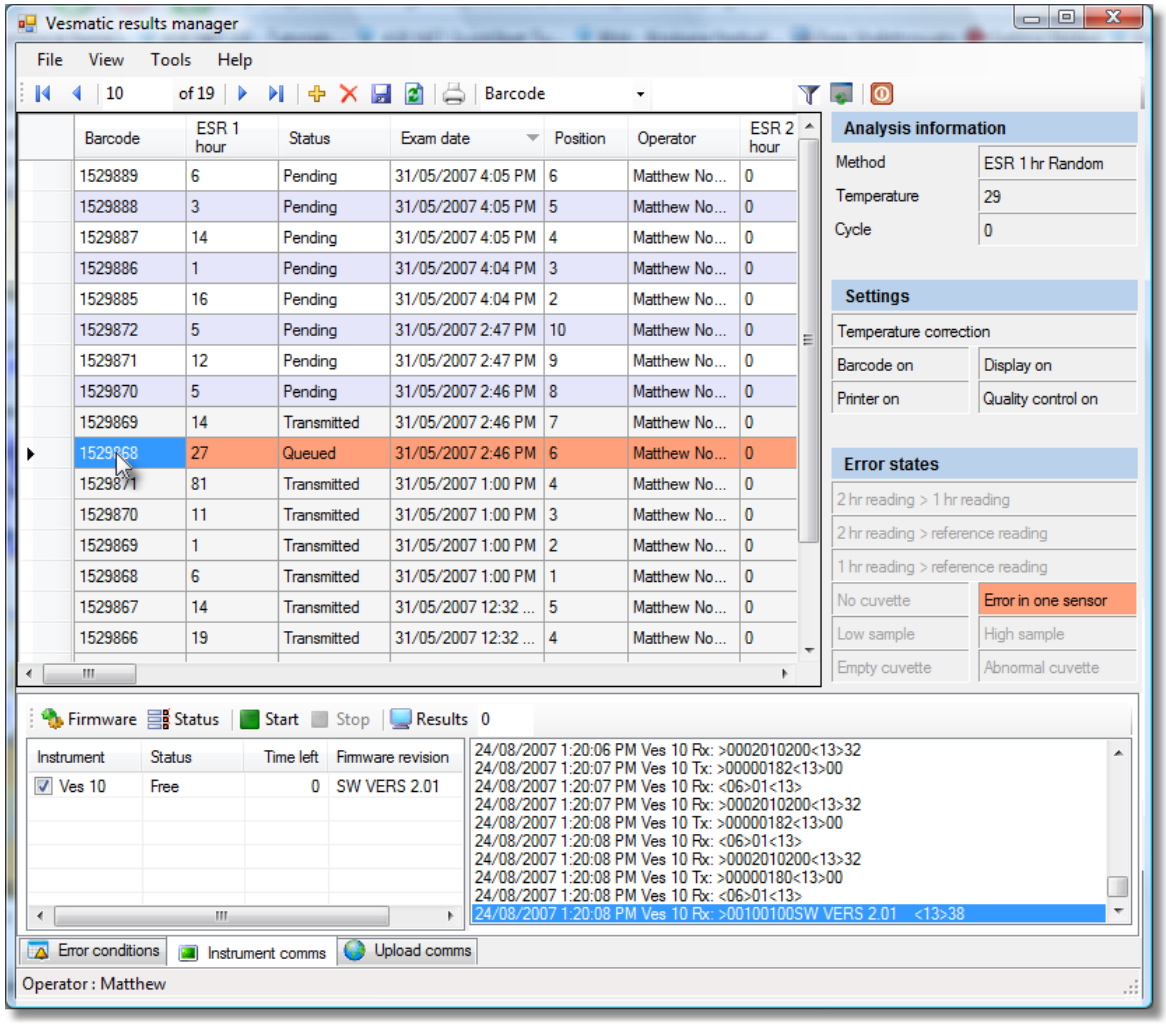
Vesmatic results manager
File View Tools Help
10 of 19 Barcode
Barcode ESR 1 hour Status Exam date Position Operator ESR 2 hour
1529889 6 Pending 31/05/2007 4:05 PM 6 Matthew No... 0
1529888 3 Pending 31/05/2007 4:05 PM 5 Matthew No... 0
1529887 14 Pending 31/05/2007 4:05 PM 4 Matthew No... 0
1529886 1 Pending 31/05/2007 4:04 PM 3 Matthew No... 0
1529885 16 Pending 31/05/2007 4:04 PM 2 Matthew No... 0
1529872 5 Pending 31/05/2007 2:47 PM 10 Matthew No... 0
1529871 12 Pending 31/05/2007 2:47 PM 9 Matthew No... 0
1529870 5 Pending 31/05/2007 2:46 PM 8 Matthew No... 0
1529869 14 Transmitted 31/05/2007 2:46 PM 7 Matthew No... 0
1529868 27 Queued 31/05/2007 2:46 PM 6 Matthew No... 0
1529871 81 Transmitted 31/05/2007 1:00 PM 4 Matthew No... 0
1529870 11 Transmitted 31/05/2007 1:00 PM 3 Matthew No... 0
1529869 1 Transmitted 31/05/2007 1:00 PM 2 Matthew No... 0
1529868 6 Transmitted 31/05/2007 1:00 PM 1 Matthew No... 0
1529867 14 Transmitted 31/05/2007 12:32 ... 5 Matthew No... 0
1529866 19 Transmitted 31/05/2007 12:32 ... 4 Matthew No... 0
Analysis information
Method ESR 1 hr Random
Temperature 29
Cycle 0
Settings
Temperature correction
Barcode on Display on
Printer on Quality control on
Error states
2 hr reading > 1 hr reading
2 hr reading > reference reading
1 hr reading > reference reading
No cuvette Error in one sensor
Low sample High sample
Empty cuvette Abnormal cuvette
Firmware Status Start Stop Results 0
Instrument Status Time left Firmware revision
Ves 10 Free 0 SW VERS 2.01
24/08/2007 1:20:06 PM Ves 10 Rx: >0002010200<13>32
24/08/2007 1:20:07 PM Ves 10 Tx: >00000182<13>00
24/08/2007 1:20:07 PM Ves 10 Rx: <06>01<13>
24/08/2007 1:20:07 PM Ves 10 Rx: >0002010200<13>32
24/08/2007 1:20:08 PM Ves 10 Tx: >00000182<13>00
24/08/2007 1:20:08 PM Ves 10 Rx: <06>01<13>
24/08/2007 1:20:08 PM Ves 10 Rx: >0002010200<13>32
24/08/2007 1:20:08 PM Ves 10 Tx: >00000180<13>00
24/08/2007 1:20:08 PM Ves 10 Rx: <06>01<13>
24/08/2007 1:20:08 PM Ves 10 Rx: >00100100SW VERS 2.01 <13>38
Error conditions Instrument comms Upload comms
Operator : Matthew

5.1 Results panel

The results panel displays the results received from the instruments, and their current status. Using the toolbar the user may

- Navigate the result data set. On selection of a new result, the sample flags panel is updated with details of the currently selected request.
- Manually enter results for subsequent transmission to the LIS
- Delete old or erroneous results
- Save any changes to the result status
- Refresh the grid view of the results data set
- Print queued results (in the event the network is down and results need to be manually entered into the LIS)
- Filter results based on certain parameters.

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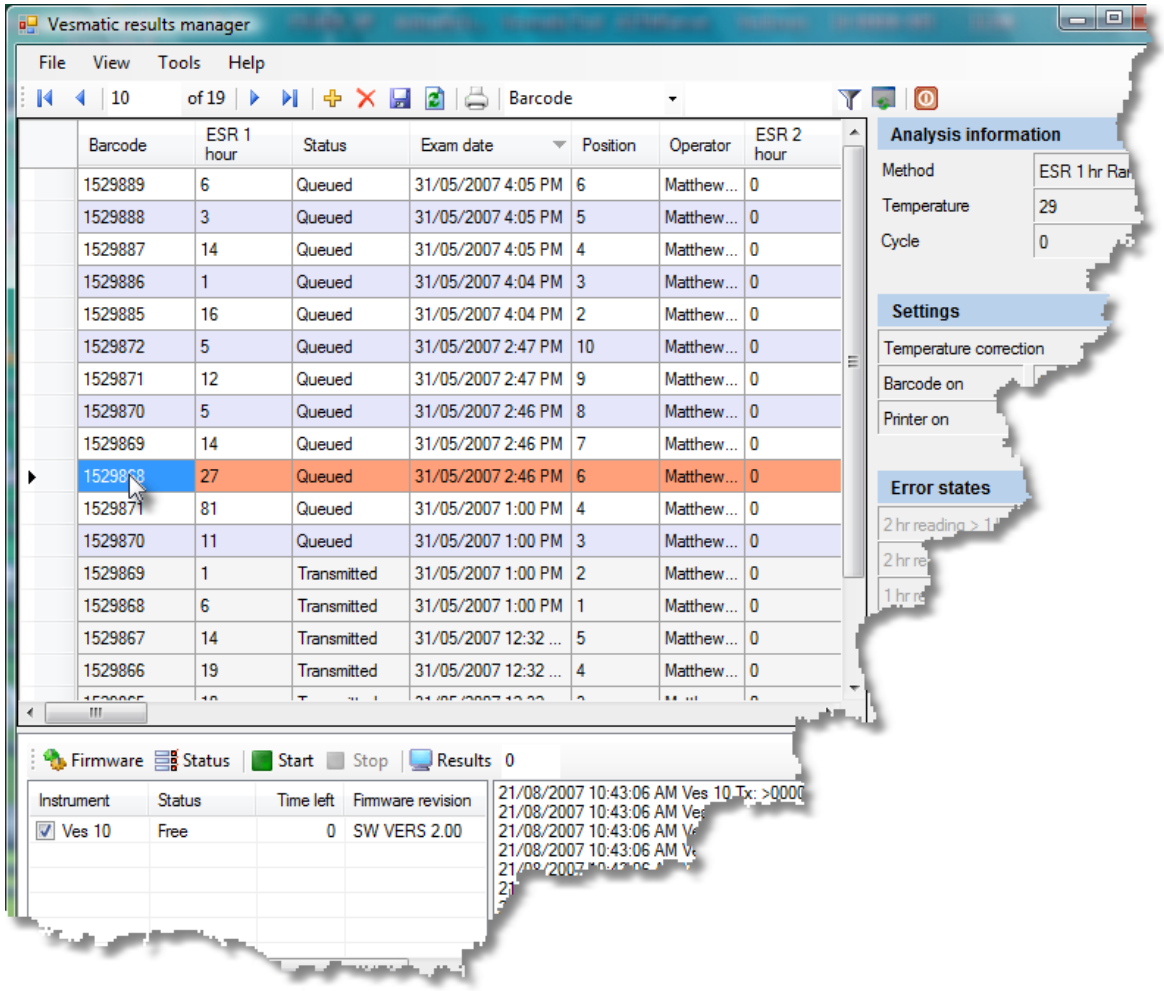
Vesmatic results manager
File View Tools Help
10 of 19 Barcode
Barcode ESR 1 hour Status Exam date Position Operator ESR 2 hour
1529889 6 Queued 31/05/2007 4:05 PM 6 Matthew... 0
1529888 3 Queued 31/05/2007 4:05 PM 5 Matthew... 0
1529887 14 Queued 31/05/2007 4:05 PM 4 Matthew... 0
1529886 1 Queued 31/05/2007 4:04 PM 3 Matthew... 0
1529885 16 Queued 31/05/2007 4:04 PM 2 Matthew... 0
1529872 5 Queued 31/05/2007 2:47 PM 10 Matthew... 0
1529871 12 Queued 31/05/2007 2:47 PM 9 Matthew... 0
1529870 5 Queued 31/05/2007 2:46 PM 8 Matthew... 0
1529869 14 Queued 31/05/2007 2:46 PM 7 Matthew... 0
1529868 27 Queued 31/05/2007 2:46 PM 6 Matthew... 0
1529871 81 Queued 31/05/2007 1:00 PM 4 Matthew... 0
1529870 11 Queued 31/05/2007 1:00 PM 3 Matthew... 0
1529869 1 Transmitted 31/05/2007 1:00 PM 2 Matthew... 0
1529868 6 Transmitted 31/05/2007 1:00 PM 1 Matthew... 0
1529867 14 Transmitted 31/05/2007 12:32 ... 5 Matthew... 0
1529866 19 Transmitted 31/05/2007 12:32 ... 4 Matthew... 0
Analysis information
Method ESR 1 hr Ra
Temperature 29
Cycle 0
Settings
Temperature correction
Barcode on
Printer on
Error states
Firmware Status Start Stop Results 0
Instrument Status Time left Firmware revision
Ves 10 Free 0 SW VERS 2.00
21/08/2007 10:43:06 AM Ves 10 Tx: >0000

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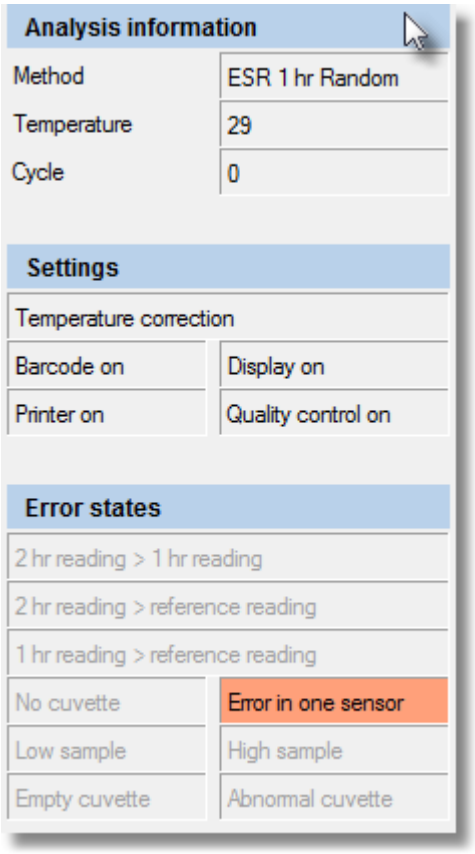
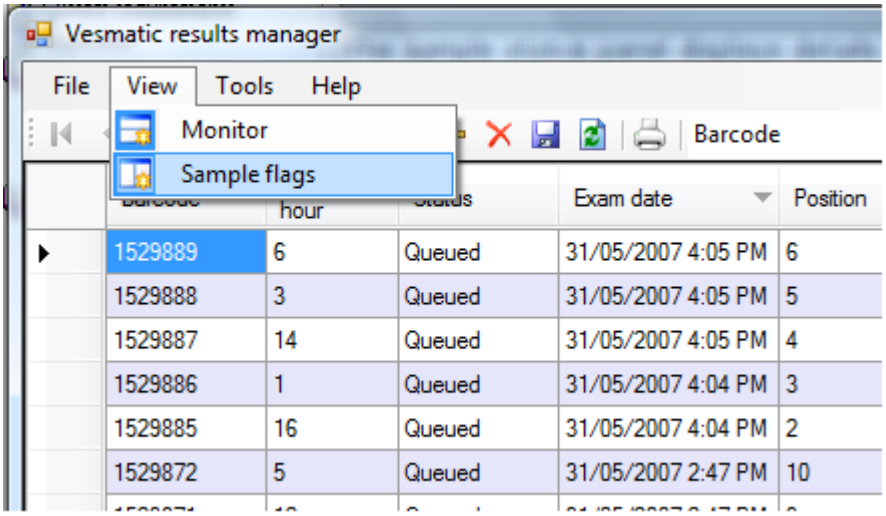
5.2 Sample flags panel

The sample flags panel displays details regarding the currently selected request in the Results panel.



If screen 'real estate' is an issue, the appearance of the sample flags panel can be controlled by checking/unchecking the **View|Sample flags** menu item.



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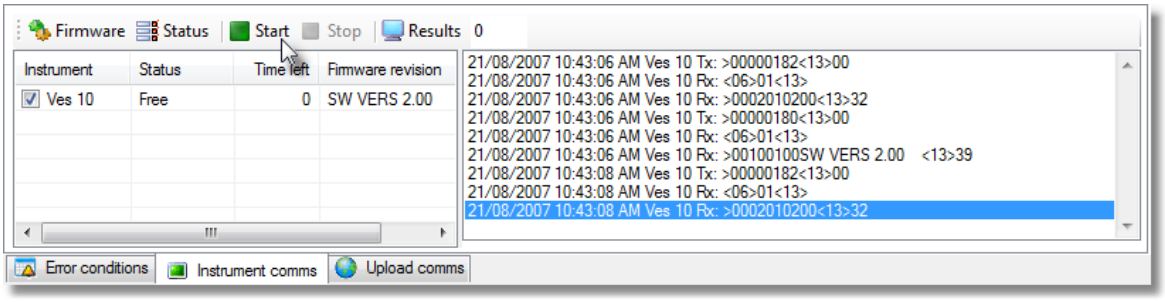
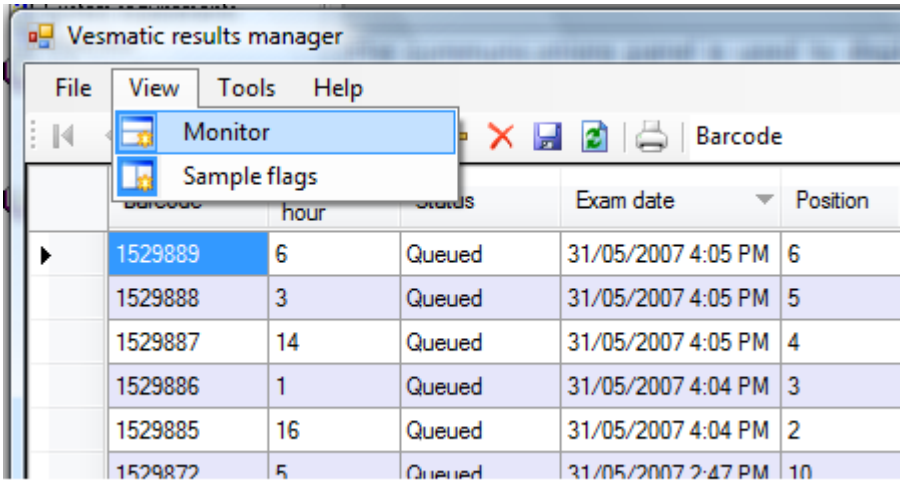
5.3 Communications panel

The communications panel is used to display error conditions, display and control instrument communications, and display LIS upload communications. In effect, the communications panel provides diagnostic functionality. Details on how the user can exploit the communications panel is provided later in this document.



If screen 'real estate' is an issue, the appearance of the communications panel can be controlled by checking/unchecking the **View|Monitor** menu item.



6 Configuration

Software configuration is stored, to the most part, in the SQL Server database. To make changes to the software configuration, select **Tools|Options**.

Some configuration information is stored in an xml-based .config file. However, we do not recommend editing this file outside the application interface.

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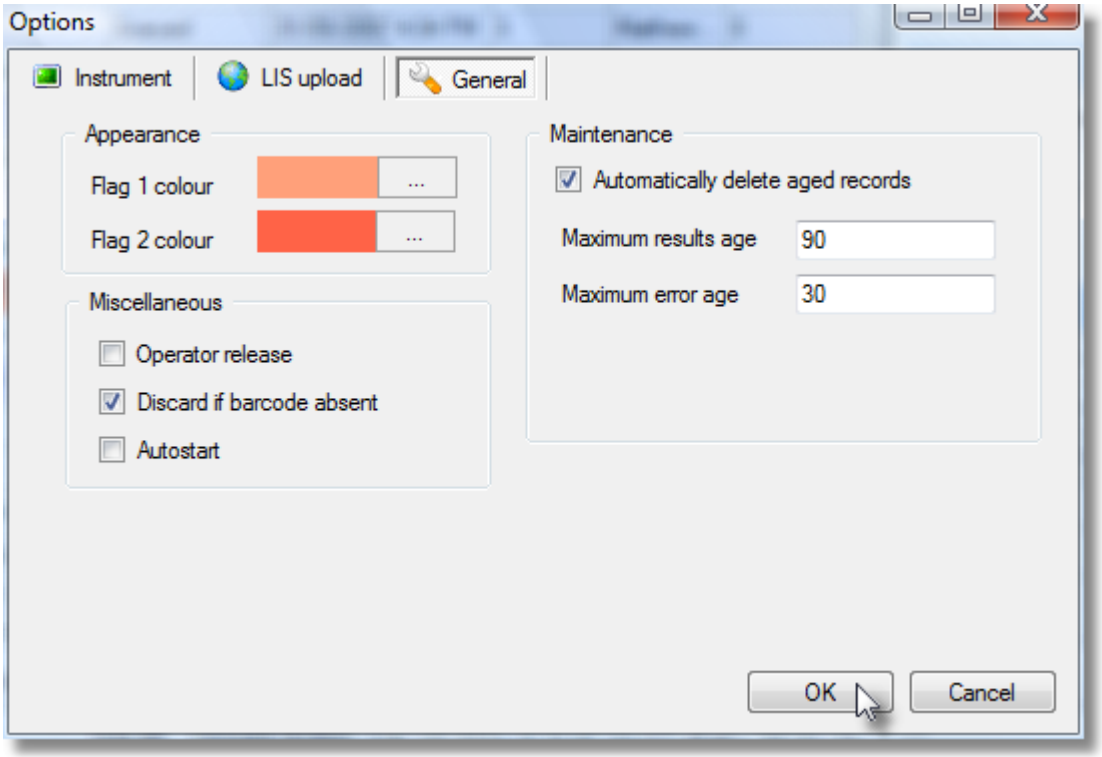
6.1 General

To modify the 'general' configuration items

1. Select **Tools|Options**.
2. Click on the **General** tab.



Fields on the **General** tab are described in the table below.

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Field	Description
Flag 1 colour	During normal operation, an encoded error flag may be returned when results are queried from the instrument, and reflects an error condition. If error flag 1 is non-zero, the results background in the results panel is shaded in this colour.
Flag 2 colour	During normal operation, an encoded error flag may be returned when results are queried from the instrument, and reflects an error condition. If error flag 2 is non-zero, the results background in the results panel is shaded in this colour. Error flag 2 has 'shading priority' over error flag 1.
Operator release	Usually, when results are received from the instrument, they are placed in a 'queued' state. The result set is queried every 5 minutes for queued results - these results are uploaded to the LIS. However, if **Operator release** is checked, when results are received from the instrument they are placed in a 'pending' state. It is the responsibility of the operator to 'release' those results to a queued state. This is achieved by using the dropdown combobox, or double clicking on the row selection column. A more detailed explanation is provided later in this document.
Discard if barcode absent	To comply with certain regulatory requirements, the software may be configured to ignore any sample result which is not identified by a barcode.
Autostart	If checked, the software will immediately initiate communications with configured and connected instruments, and LIS.
Automatically delete aged results	If checked, aged results are deleted by the software. The maximum age is determined by its status and the values defined in **maximum results age** and **maximum error age**.
Maximum results age	In days, once the sample result (without an error condition) has exceeded this age it will be deleted during the next database 'cleansing'.
Maximum error age	In days, once the sample result (with an error condition) has exceeded this age it will be deleted during the next database 'cleansing'.

6.1.1 Operator release

Operator release is used when result validation/acceptance is required before uploading results to the LIS. When **Operator release** is checked, new results are initially tagged as **Pending** (rather than **Queued**).

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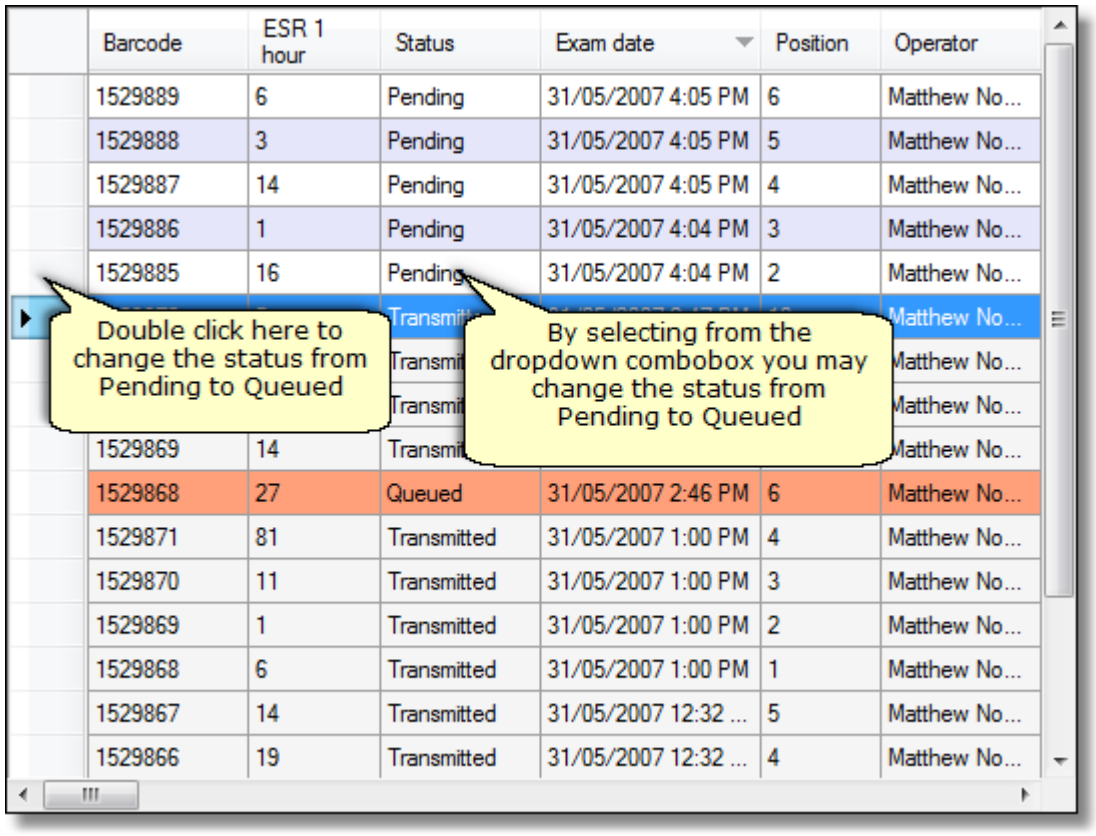
Users may change the status from **Pending** to **Queued** in one of two ways

1. Dropdown the status combobox and select the **Queued** item, or
2. Double click on the row selection column on the left hand side of the grid.


Barcode
ESR 1 hour
Status
Exam date
Position
Operator
1529889 6 Pending 31/05/2007 4:05 PM 6 Matthew No...
1529888 3 Pending 31/05/2007 4:05 PM 5 Matthew No...
1529887 14 Pending 31/05/2007 4:05 PM 4 Matthew No...
1529886 1 Pending 31/05/2007 4:04 PM 3 Matthew No...
1529885 16 Pending 31/05/2007 4:04 PM 2 Matthew No...
1529868 27 Queued 31/05/2007 2:46 PM 6 Matthew No...
1529871 81 Transmitted 31/05/2007 1:00 PM 4 Matthew No...
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1529869 1 Transmitted 31/05/2007 1:00 PM 2 Matthew No...
1529868 6 Transmitted 31/05/2007 1:00 PM 1 Matthew No...
1529867 14 Transmitted 31/05/2007 12:32 ... 5 Matthew No...
1529866 19 Transmitted 31/05/2007 12:32 ... 4 Matthew No...
Double click here to change the status from Pending to Queued
By selecting from the dropdown combobox you may change the status from Pending to Queued

6.2 Instrument

To modify the 'instrument(s)' configuration items

1. Select **Tools|Options**.
2. Click on the **Instrument** tab.
3. Instruments may be added, updated, or deleted. Remember to click on the **Save** button once you are satisfied with your changes.

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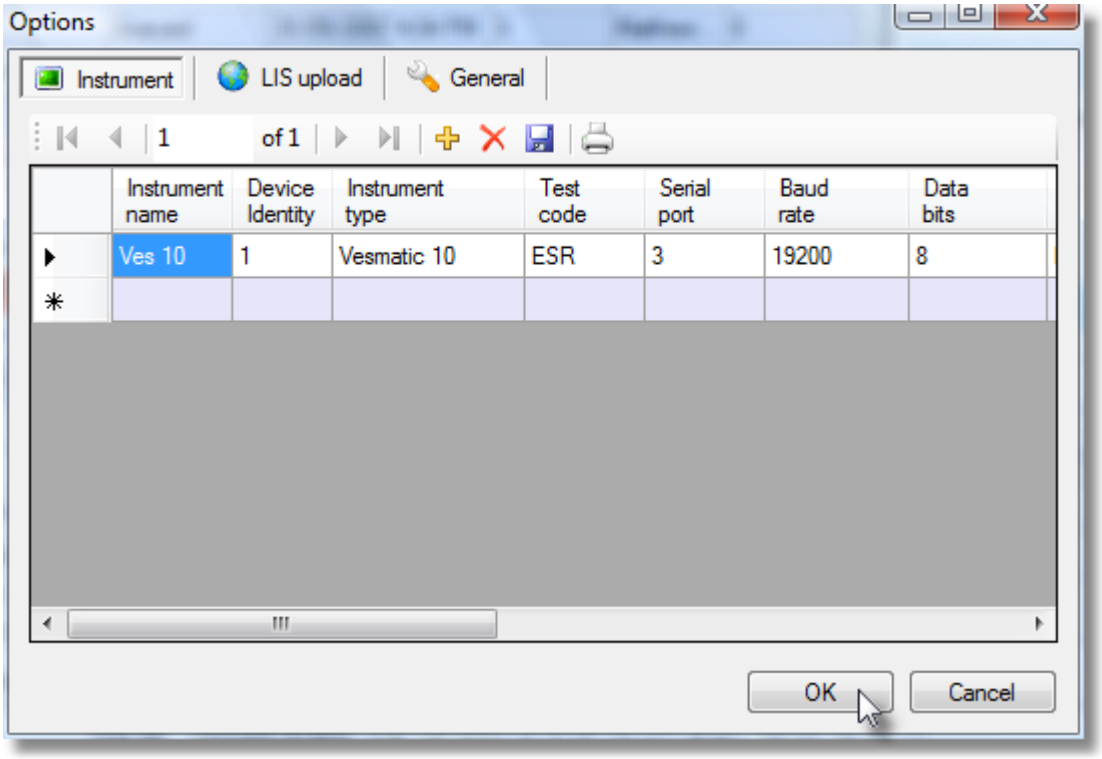

6.2.1 Instrument name, device id and instrument type

The instrument name is a unique name given to each instrument, and should follow an enterprise-wide policy for naming devices. The name is used when storing results in a temporary folder.

As part of the communications protocol, each instrument is addressed by its device id. By entering Service Mode (on the Vesmatic instruments), the **device id** can be viewed and/or changed. Unless the correct device id is entered for the **Device identity** field, the application can not communicate with the instrument. Please consult the instrument Service Manual for more details.

It is important to select the correct instrument type. While the Vesmatic family of instruments use the 'new protocol', each model has a slightly different command set. By selecting the instrument type, the software knows which command set to use.

6.2.2 Serial communications

While determining the serial comm port for the Vesmatic-20 is easy (it is connected to a serial port on the computer), the Vesmatic-10 is a little more difficult. After you have installed the USB->serial port device driver (supplied with the Vesmatic-10 instrument), connected the Vesmatic-10 to a USB port, and powered it on, you will need to open Device Manager to determine the serial port number assigned to this instrument connection.

The easiest way to check you've established communications is to configure the

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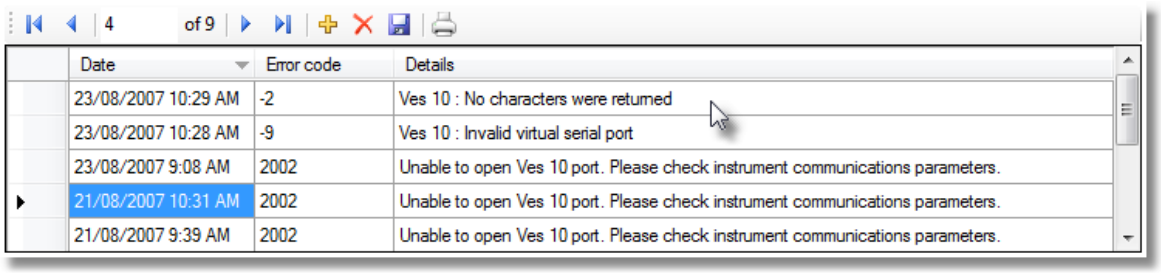
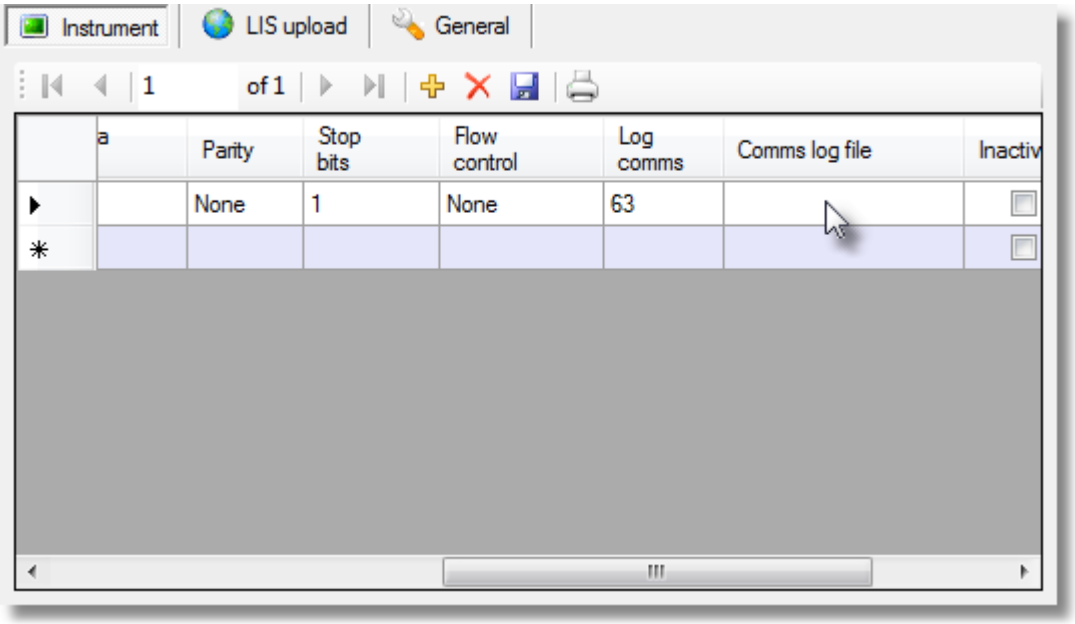
serial comm port settings, and click on the **Firmware** button. If you have not established communications, you will receive an error message similar to the one below.



6.2.3 Logging

The **Log comms** and **Comms log file** fields control the communications trace output to both the screen and trace file. Bear in mind these instruments are 'comms intensive' and the trace file will grow rapidly. It is your responsibility to ensure the file does not grow too large - the software will fail if the file grows to the maximum text file size.



The **Comms log file** field defines the full path to the trace file for the instrument. The recommended convention is to use the same name as the instrument name.

The **Log comms** field is an encoded integer value. Determine your requirements, sum the corresponding values, and enter the value into the instrument configuration. Please refer to the table below.

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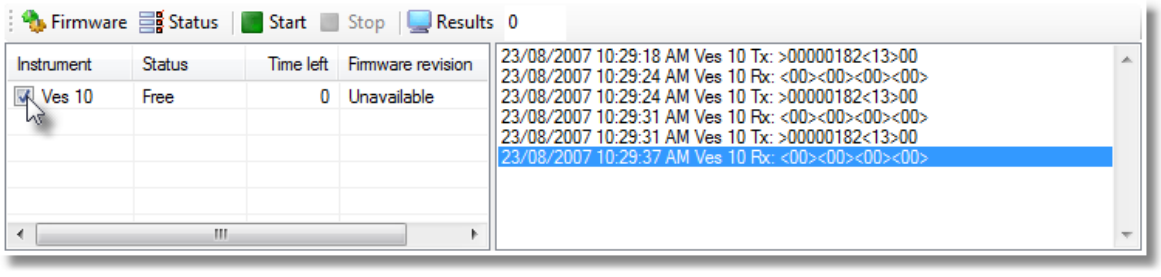
Comms requirement	Value
No logging	0
Log results comms to trace file	1
Log results comms to screen	2
Log firmware comms to trace file	4
Log firmware comms to screen	8
Log status comms to trace file	16
Log status comms to screen	32

Commonly used values are listed in the table below.

Value	Description
43	Log all comms to the screen, and result comms to the trace file (1+2+8+32) [Recommended]
42	Log **all** comms to the screen only (2+8+32)
63	Log all comms to the screen and trace file (1+2+4+8+16+32)
23	Log all comms information to the trace file, and just the results comms to screen (1+2+4+16)
21	Log all comms to the trace file only (1+4+16)

6.2.4 Disabling an instrument

In some circumstances you may wish to temporarily switch an instrument out-of-service. Rather than deleting the corresponding instrument record, or setting its state to **Inactive** in the database, you may uncheck the checkbox in the instrument list.



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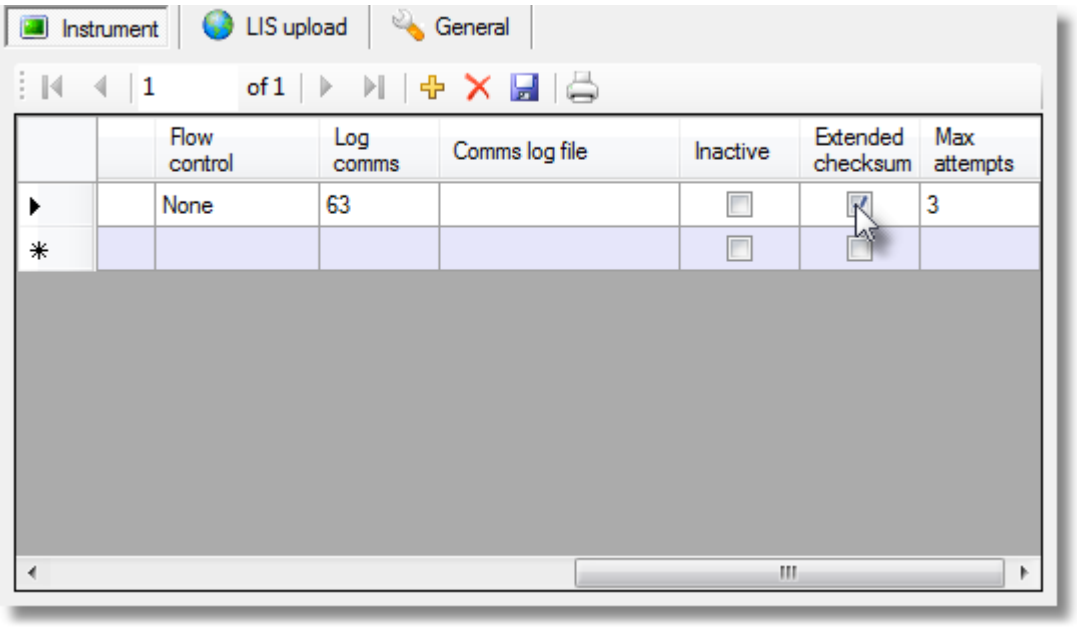
The next time the software is restarted, the instrument(s) configuration is read from the database and its 'active' state is restored. Changing the 'active' state of the instrument via the checkbox should be considered a temporary condition.

6.2.5 Checksum calculations

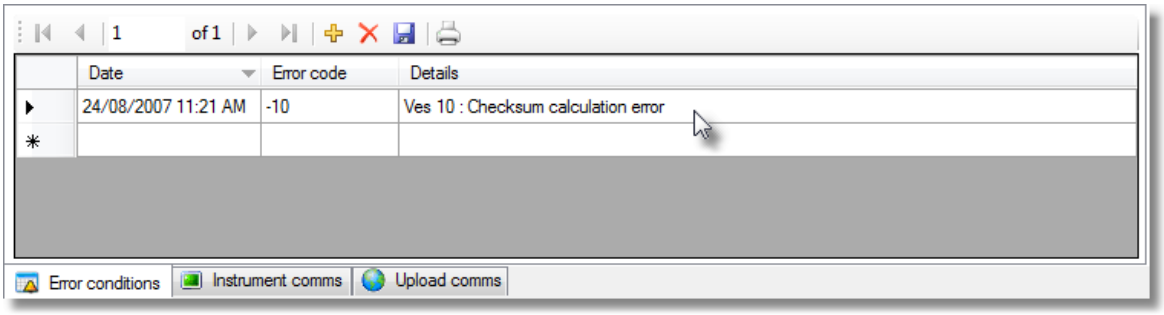
During testing it was discovered that certain firmware revisions did not calculate the checksum as documented. To include the carriage return character in the checksum calculation, check the **Extended checksum** checkbox.



At the time of writing this document, this applies to all Vesmatic-10/Vesmatic-Easy instruments.

In all other cases, leave the **Extended checksum** checkbox unchecked.

If during initial setup the interface displays a checksum error (see below), toggle the **Extended checksum** checkbox and try again.



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6.3 LIS upload

The software supports the ability to upload results to an LIS (Laboratory Information System) via RS-232, TCP/IP or ASCII file. If you do not require LIS upload please ensure the **None** radio button is selected.

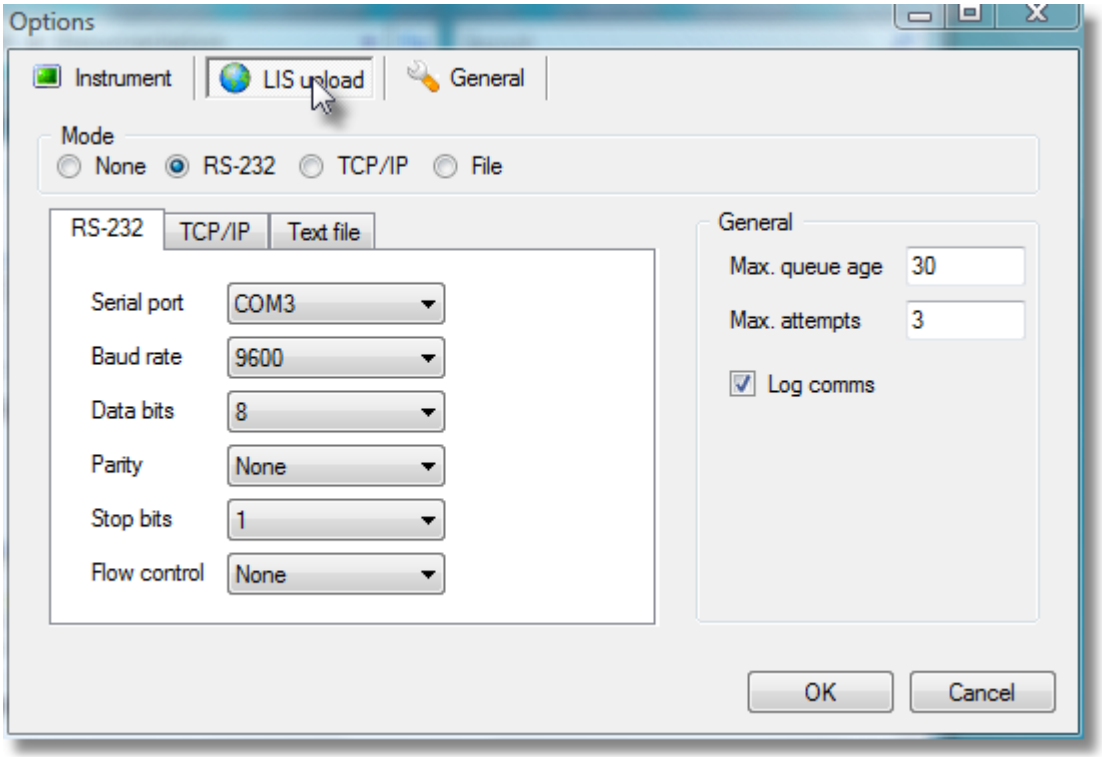
The software uses ASTM 1381 & ASTM 1394 to upload results via RS-232 or TCP/IP. ASTM 1394 defines the message format, while ASTM 1381 defines the communication protocol. The softwarer operates in a broadcast mode, i.e. it establishes connection with the receiving computer, transmits results, and terminates the connection.

It is the users responsibility to provide the necesssary software to receive results and insert them into the LIS.

6.3.1 Upload results using RS-232

To modify the LIS upload options so that the software uses RS-232 to upload results to the LIS

1. Select **Tools|Options**.
2. Click on the **LIS Upload** tab.
3. Check the **RS-232** radio button, and enter the appropriate parameters in the **RS-232** page.
4. If you wish to view the comms in the comms trace window, check the **Log comms** checkbox.
5. Click on the **OK** button.



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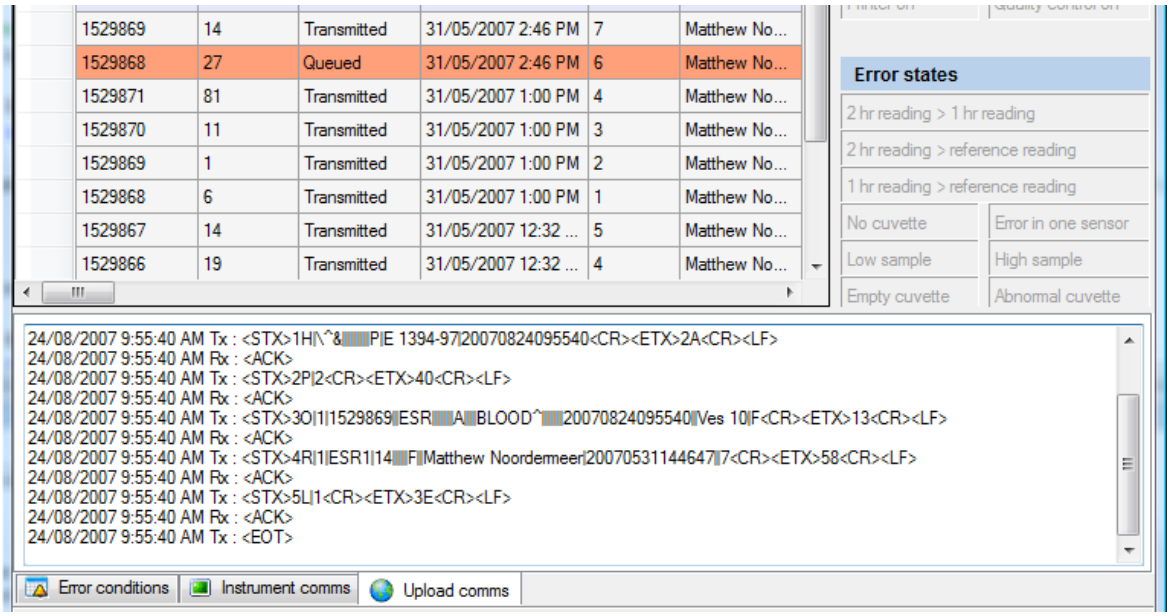
Below is an example of the communications trace of an RS-232 LIS upload.


1529869 14 Transmitted 31/05/2007 2:46 PM 7 Matthew No...
1529868 27 Queued 31/05/2007 2:46 PM 6 Matthew No...
1529871 81 Transmitted 31/05/2007 1:00 PM 4 Matthew No...
1529870 11 Transmitted 31/05/2007 1:00 PM 3 Matthew No...
1529869 1 Transmitted 31/05/2007 1:00 PM 2 Matthew No...
1529868 6 Transmitted 31/05/2007 1:00 PM 1 Matthew No...
1529867 14 Transmitted 31/05/2007 12:32 ... 5 Matthew No...
1529866 19 Transmitted 31/05/2007 12:32 ... 4 Matthew No...
Error states
2 hr reading > 1 hr reading
2 hr reading > reference reading
1 hr reading > reference reading
No cuvette
Error in one sensor
Low sample
High sample
Empty cuvette
Abnormal cuvette
24/08/2007 9:55:40 AM Tx : <STX>1H|\^&|||P|E 1394-97|20070824095540<CR><ETX>2A<CR><LF>
24/08/2007 9:55:40 AM Rx : <ACK>
24/08/2007 9:55:40 AM Tx : <STX>2P|2<CR><ETX>40<CR><LF>
24/08/2007 9:55:40 AM Rx : <ACK>
24/08/2007 9:55:40 AM Tx : <STX>3O|1|1529869||ESR|||A|||BLOOD^|||20070824095540|||Ves 10|F<CR><ETX>13<CR><LF>
24/08/2007 9:55:40 AM Rx : <ACK>
24/08/2007 9:55:40 AM Tx : <STX>4R|1|ESR1|14|||F|||Matthew Noordermeer|20070531144647|||7<CR><ETX>58<CR><LF>
24/08/2007 9:55:40 AM Rx : <ACK>
24/08/2007 9:55:40 AM Tx : <STX>5L|1<CR><ETX>3E<CR><LF>
24/08/2007 9:55:40 AM Rx : <ACK>
24/08/2007 9:55:40 AM Tx : <EOT>
Error conditions
Instrument comms
Upload comms

6.3.2 Upload results using TCP/IP

To modify the LIS upload options so that the software uses TCP/IP to upload results to the LIS

1. Select **Tools|Options**.
2. Click on the **LIS Upload** tab.
3. Check the **TCP/IP** radio button, and enter the appropriate parameters in the **TCP/IP** page.
4. If you wish to view the comms in the comms trace window, check the **Log comms** checkbox.
5. Click on the **OK** button.

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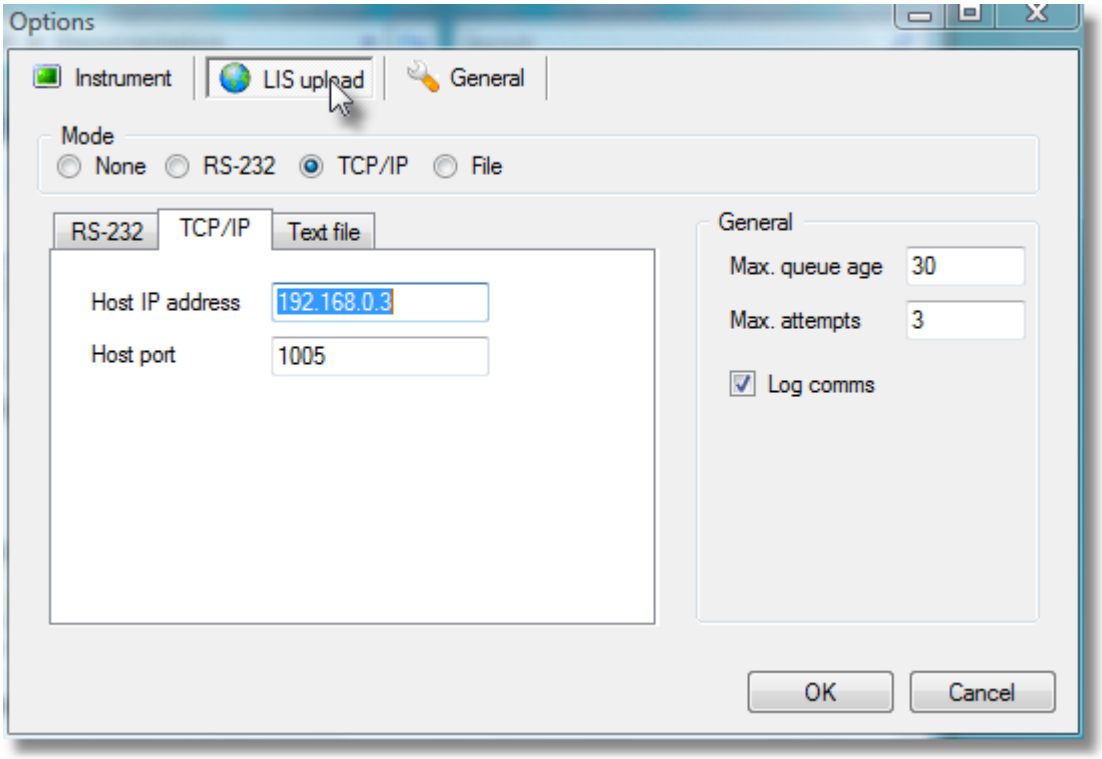
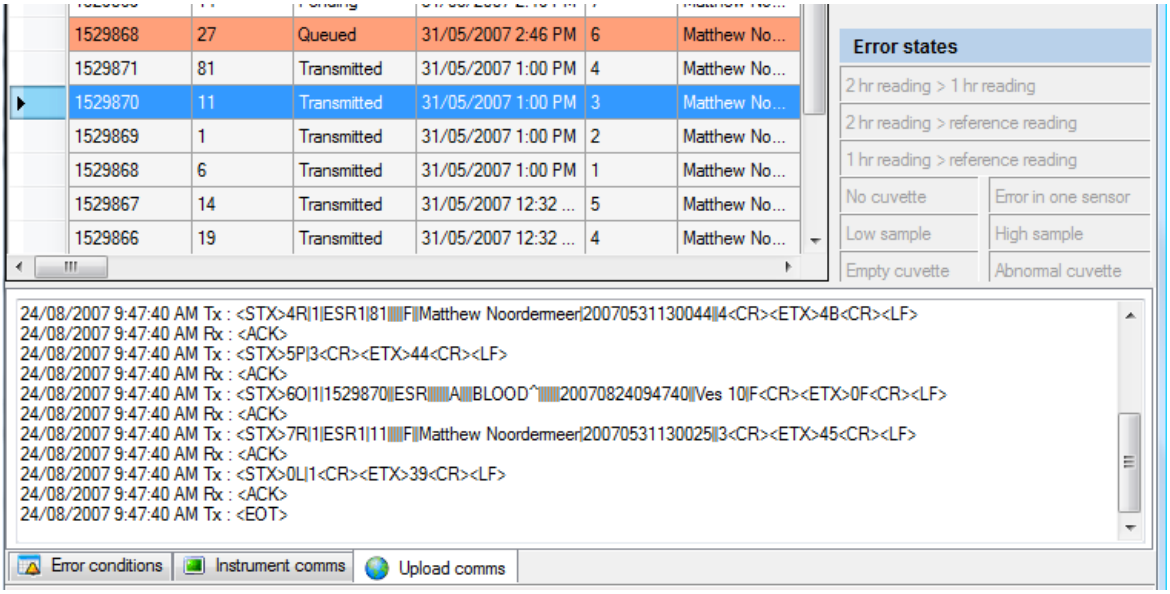


Below is an example of the communications trace of an TCP/IP LIS upload.


1529868 27 Queued 31/05/2007 2:46 PM 6 Matthew No...
1529871 81 Transmitted 31/05/2007 1:00 PM 4 Matthew No...
1529870 11 Transmitted 31/05/2007 1:00 PM 3 Matthew No...
1529869 1 Transmitted 31/05/2007 1:00 PM 2 Matthew No...
1529868 6 Transmitted 31/05/2007 1:00 PM 1 Matthew No...
1529867 14 Transmitted 31/05/2007 12:32 ... 5 Matthew No...
1529866 19 Transmitted 31/05/2007 12:32 ... 4 Matthew No...
Error states
2 hr reading > 1 hr reading
2 hr reading > reference reading
1 hr reading > reference reading
No cuvette
Error in one sensor
Low sample
High sample
Empty cuvette
Abnormal cuvette
24/08/2007 9:47:40 AM Tx : <STX>4R|1|ESR1|81|||F|Matthew Noordermeer|20070531130044||4<CR><ETX>4B<CR><LF>
24/08/2007 9:47:40 AM Rx : <ACK>
24/08/2007 9:47:40 AM Tx : <STX>5P|3<CR><ETX>44<CR><LF>
24/08/2007 9:47:40 AM Rx : <ACK>
24/08/2007 9:47:40 AM Tx : <STX>6O|1|1529870||ESR|||A|||BLOOD^|||20070824094740||Ves 10|F<CR><ETX>0F<CR><LF>
24/08/2007 9:47:40 AM Rx : <ACK>
24/08/2007 9:47:40 AM Tx : <STX>7R|1|ESR1|11|||F|Matthew Noordermeer|20070531130025||3<CR><ETX>45<CR><LF>
24/08/2007 9:47:40 AM Rx : <ACK>
24/08/2007 9:47:40 AM Tx : <STX>0L|1<CR><ETX>39<CR><LF>
24/08/2007 9:47:40 AM Rx : <ACK>
24/08/2007 9:47:40 AM Tx : <EOT>
Error conditions
Instrument comms
Upload comms

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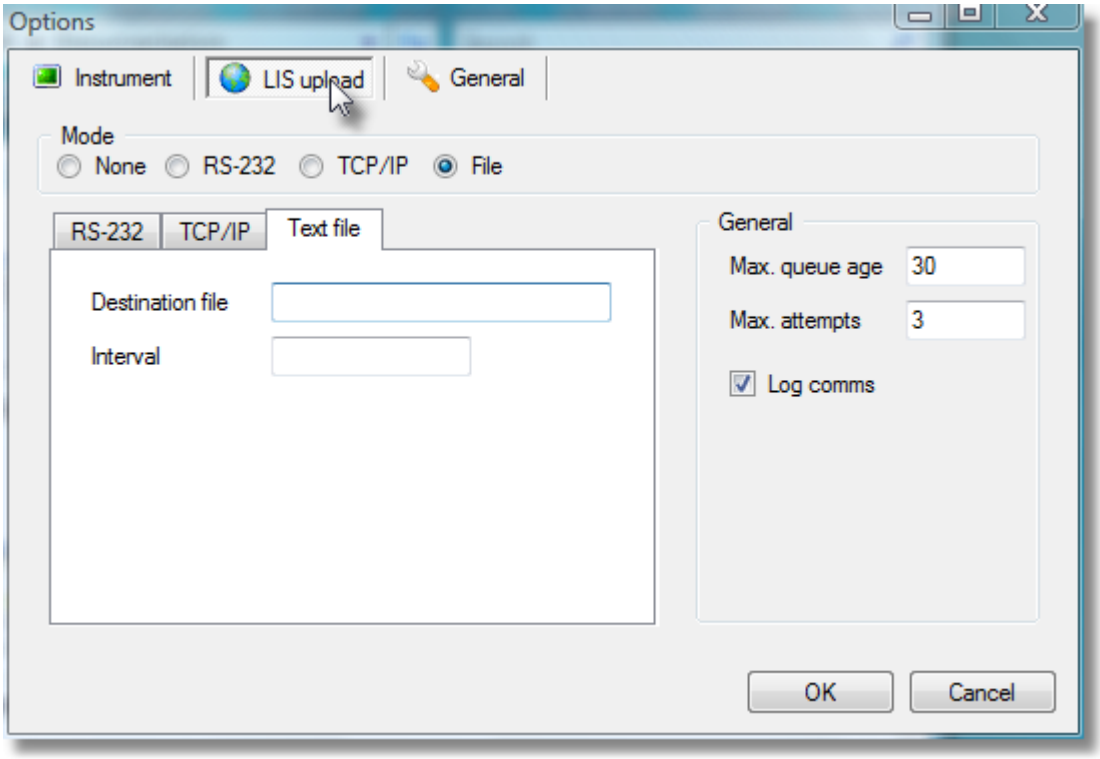
6.3.3 Save results to file

To modify the LIS upload options so that the software writes results to an ASCII file (for subsequent import to the LIS)

1. Select **Tools|Options**.
2. Click on the **LIS Upload** tab.
3. Check the **File** radio button, and modify the parameters in the **File** page. Ensure these settings match the settings of the receiver.
4. Click on the **OK** button.



*The software places an exclusive lock on the **Destination file** when it is writing results. The program reading the file must handle situations when the file is locked.*

Results are saved to the destination file for subsequent LIS upload. When results are written to the destination file, the file is opened with exclusive access. If the file is already open, e.g. by the LIS upload program, the results are archived to a subfolder of the Windows temporary folder. Using the example above, on Windows Vista, results will be saved into the local archive file

C:\Users\<*user name*>\AppData\Local\Temp\BRIVES10\BRIVES10.txt

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On regular intervals, the application checks for the existence of instrument archive files, and the availability of the output file(s) intended for LIS upload. If the output file is accessible, the records in the archive file are moved to the output file. Upon successful migration to the output file, the archive file is deleted.

The output file is a pipe-delimitered file. Each record contains the following information:

Field no.	Field	Notes
1	Barcode	
2	Instrument name	
3	Operator	Current user
4	Instrument id	
5	ESR 1 hour	
6	ESR 2 hour	
7	Katz Index	
8	Flag 1	Please refer to the instrument manual
9	Flag 2	Please refer to the instrument manual (Relevant to Vesmatic-10 only)
10	Position	
11	Test cycle number	
12	Test date	
13	Log date	
14	Temperature	
15	Temperature correction	True or False
16	Barcode setting	True or False
17	Display setting	True or False
18	Method type	ESR 1 HOUR = 1 ESR 2 HOUR = 2 ESR 1 HOUR RANDOM = 3 ESR 2 HOUR RANDOM = 4 ESR 1 HOUR KINETIC = 5 ESR 2 HOUR KINETIC = 6
19	Printer setting	True or False

An example of an output file appears below:

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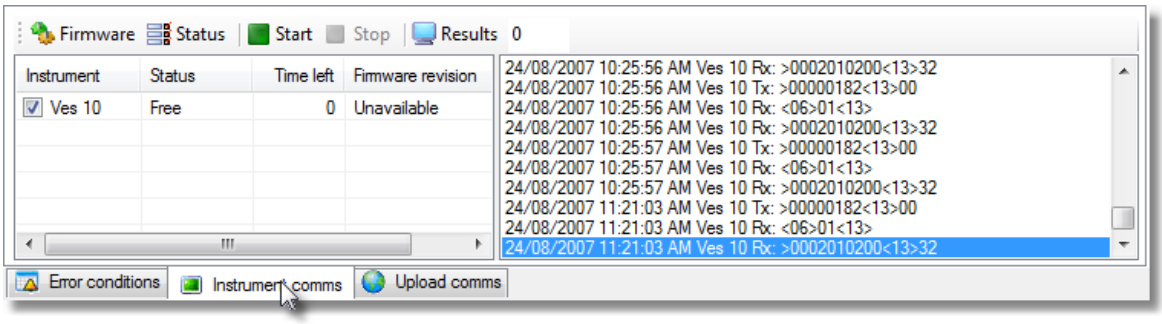
1529877|BRIVES10|Matthew|1|13|0|0|0|0|5|0|4/06/2007 1:40:09 PM|18/06/2007 9:02:03 AM|35|True|True|True|3|True
1529876|BRIVES10|Matthew|1|18|0|0|0|0|4|0|4/06/2007 1:38:38 PM|18/06/2007 9:02:03 AM|33|True|True|True|3|True
1529875|BRIVES10|Matthew|1|31|0|0|0|0|3|0|4/06/2007 1:37:39 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529874|BRIVES10|Matthew|1|1|0|0|0|0|2|0|4/06/2007 1:37:07 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529873|BRIVES10|Matthew|1|15|0|0|0|0|1|0|4/06/2007 1:36:59 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529892|BRIVES10|Matthew|1|8|0|0|0|0|10|0|4/06/2007 2:16:48 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529891|BRIVES10|Matthew|1|17|0|0|0|0|9|0|4/06/2007 2:16:48 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529890|BRIVES10|Matthew|1|6|0|0|0|0|8|0|4/06/2007 2:16:48 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529889|BRIVES10|Matthew|1|1|0|0|0|0|7|0|4/06/2007 2:16:48 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True
1529888|BRIVES10|Matthew|1|28|0|0|0|0|6|0|4/06/2007 2:16:48 PM|18/06/2007 9:02:03 AM|32|True|True|True|3|True

7 Operation

The software provides the ability to perform simple communications with the instrument.

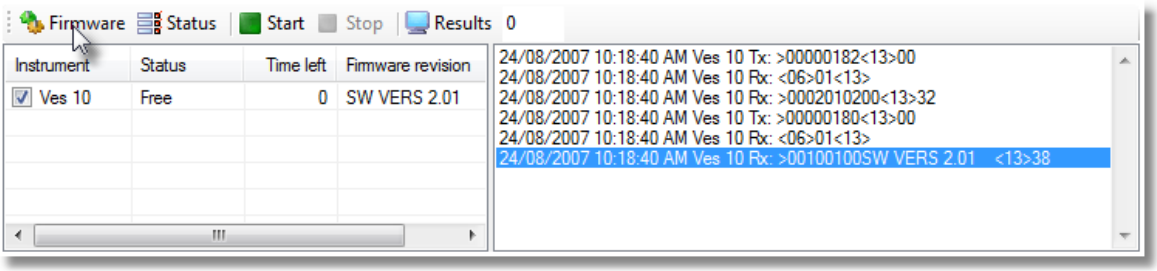
To access these functions, click on the **Instrument comms** tab on the bottom of the window.



7.1 Firmware revision

The instrument firmware revision can be obtained by clicking on the **Firmware** button.

The software will issue a command to each instrument in the list requesting its firmware revision. Upon receipt, the firmware revision is displayed.



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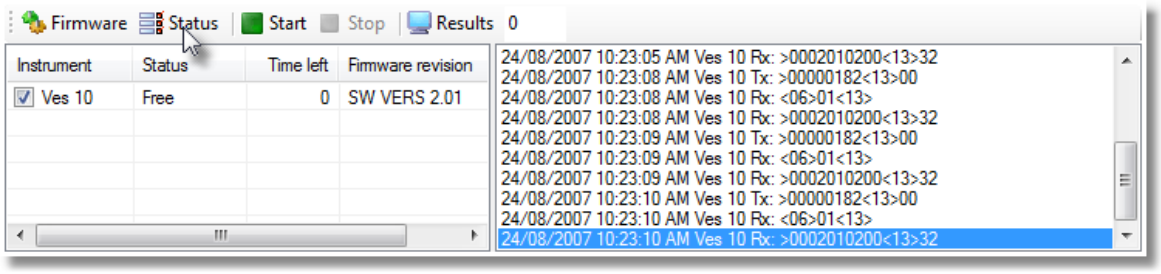
7.2 Instrument status

Instrument status can be obtained by clicking on the **Status** button.

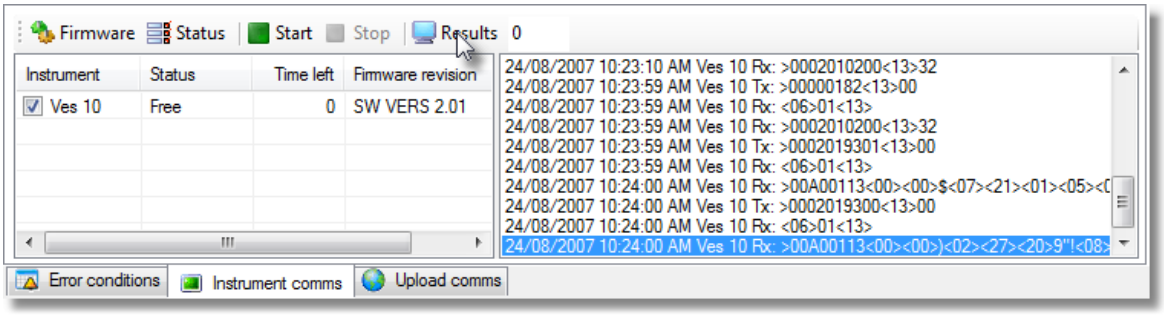
The software will issue a command to each instrument in the list requesting its status. Upon receipt, the instrument status is displayed. During normal analysis, the instrument is continuously polled for its status and the user interface is updated 'real time'.



7.3 Manual results retrieval

To manually retrieve results from the instrument, click on the **Results** button.

The software will issue a command to each instrument in the list requesting result sets. Upon receipt, results are displayed in the Results panel. A result set of 0 requests the latest results. Please refer to the instrument manual for details on result sets.



7.4 Normal analysis

To enter Normal analysis mode, click on the **Start** button.

The software will commence instrument monitoring. As each instrument completes analysis and enters a state where results can be retrieved, the software issues commnds to retrieve, display and log results for LIS upload.

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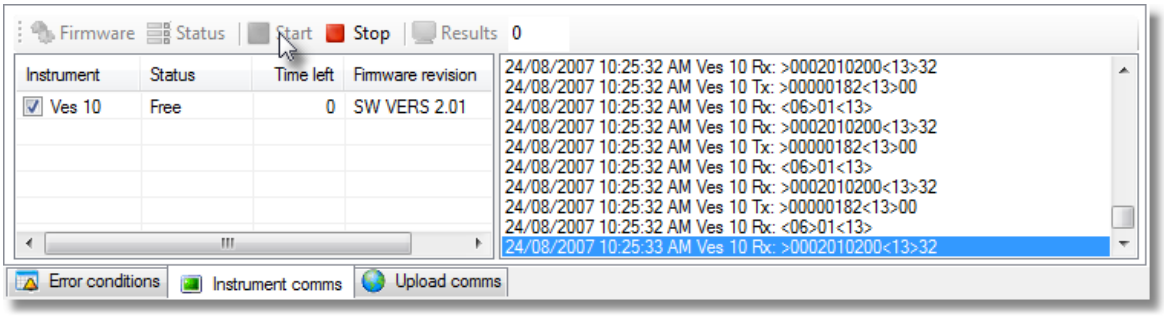

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